

Docket #: Bos.C-01

APPLICATION

Of

Con Bos

For

UNITED STATES LETTERS PATENT

On

Safety System and Method of Use for High Workers

Sheets of Drawings: Four (4)

TITLE: Safety System and Method of Use for High Workers

BACKGROUND OF THE INVENTION

5 INCORPORATION BY REFERENCE:

Applicant(s) hereby incorporate herein by reference, any and all U. S. patents referred to in this application.

FIELD OF THE INVENTION:

10 This invention relates generally to safety equipment and the use thereof and more particularly to a safety equipment for workers on scaffolds or otherwise situated in high and precarious locations.

DESCRIPTION OF RELATED ART:

15 The following art defines the present state of this field:

Glynn et al., U.S. 4,249,713 describes an attachment member for roof peaks to which a safety line can be clipped. A strip of metal is bent to define a central portion with two juxtaposed panels, and outwardly extending legs adapted to be secured to roof joists. The 20 central portion has an aperture for the hook portion of the clip, the hook being flattened. The aperture is elongated, and is narrower than the width of the flattened hook portion, whereby the hook portion, when engaged with the aperture, is restricted in terms of rotation.

Courchesne et al., U.S. 4,957,185 describes a novel deployable and stackable accordion 25 shutter system including an overhead header presenting a track and a laterally disposed abutment surface. The system includes a plurality of trolley supported shutter member, which are rotatable about a vertical axis adjacent one-edge portion thereof. The system further includes a sill having a guide slot, which is disposed beneath the track in alignment therewith. The sill also has an abutment surface disposed in alignment with the abutment

surface of the header. The shutter members carry abutment-contacting elements disposed for coming into contact with the abutment surfaces to rigidify the structure when the shutter system is deployed. Additional abutment surfaces are provided adjacent the edge of the shutter which is supported by the trolley for further strength. The shutter members are 5 specially configured to facilitate close stacking of the system. In addition, a specially configured washer is provided again for the purpose of facilitating close stacking of the system when it is not deployed.

Crocker et al., U.S. 5,036,949 describes a motion-stopping safety system for persons, 10 workers, and in one embodiment for roof workers. A gripping anchor for gripping a structural member that is useful in such systems. In one embodiment a gripping anchor has a C-shaped body member with facing members secured thereto and a line connection device, e.g. an opening or a clevis, shackle, or metal loop, connected to the body member. In one embodiment a motion-stopping safety system uses two or more such anchors between which 15 extend a rope, line, cable, etc., and to which a person's safety tether is movably or immovably attached.

Glynn, U.S. 5,54,576 describes a lifeline safety system for a pitched roof employing a frame for mounting a lifeline system above the peak of the roof. Shoulders extend from the frame 20 and engage opposing sides of the roof. An anchor comprising a generally J-shaped bolt secures the bracket assembly to the roof. The bolt has a hook, which engages the underside of the rafter. A nut has a pair of arms for torquing the nut to the bolt.

Lebow, U.S. 5,105,907 describes an improved intermediate support for ensuring the safety 25 of a worker while moving relative to a fixed structure at elevated locations, with the worker being secured by a lanyard to a safety or fall restraint cable. The intermediate support is secured to the fixed structure, and includes a supporting plate having a notch along the periphery thereof for receiving the safety cable, and a pair of opposing hook members positioned on opposite sides of the supporting plate. The hook members prevent the safety

cable from inadvertently or intentionally moving out of the notch. The method of the present invention ensures that an end of the lanyard secured to the safety cable may be quickly and easily moved sequentially past one hook member, then the supporting plate, and then the other hook member to allow the worker to efficiently and safely move past the intermediate support.

Rhodes, U.S. 5,092,426 describes first and second elongated members are slidable along each other to form a beam of variable length to span the top surface of a structure on which a worker is positioned. Clamping surfaces extend from the ends of the beam to engage the sides of the structure. A lever pivotally mounted on the first elongated member is connected through a link to the second elongated member to shorten the beam and urge the clamping surfaces against the structure. A worker's safety line may be attached to the device such that the lever is locked relative to the first elongated member to secure the device to the structure whenever the safety line is attached.

Babcock, U.S. 5,282,597 describes a safety line anchor device holds a safety line for workmen and is generally intended for use in roof construction. The device is especially useful for use on wood truss roofs of any pitch. The first embodiment of the invention is constructed and arranged for use on one side of a wood truss, 24" centered roof of any pitch. This safety line anchor device comprises a main bar from which fastening straps extend, and at least one anchoring means for holding a safety line. The device is adapted to receive a fastening means, by which it is fixed to a roof. This embodiment can be designed for one or multiple anchor points. A second embodiment of the invention is adapted for use on the peak of a roof and comprises two pivotally joined anchors which straddle the roof peak, each anchor having an anchoring means for holding a safety line attached thereto. A third embodiment is adapted for use on the end peaks of a roof and comprises a pair of supports, each further comprising a central bar from which fastening straps extend, the supports being pivotally joined by a main support to which a safety line anchoring means is attached, from which a safety line may extend down the sides of a house. All embodiments are capable of

withstanding a load of at least 5,000 pounds per person. A special hook latch allows only one safety line end to be attached to each anchor point. In addition, a protective shield is used to protect the safety line and the roof from abrasion.

5 Woodyard, U.S. 5,287,944 describes one or more roof mounted anchors are preferably permanently installed: during the initial construction of a building; during the renovation of a building; during the inspection time and/or maintenance time of a building; during installation and cleaning of roofs and gutters; during installation of antennas and cables, etc. Each roof mounted anchor has: a base member formed to fit a roof and having spaced holes
10 to receive screw or screw like fasteners used in securing this anchor to the roof structure of a building; an integral upright anchoring eyelet structure secured to the base member in the center portion thereof and having an eyelet to receive portions of a cable, or hook; preferably a gusset integrally extending between the base member and the integral upright anchoring eyelet structure; and preferably the gusset has an integral cable receiving hole structure
15 centrally located to receive and to anchor a portion of a cable. Then, when at least two roof mounted anchors are mounted on a ridge of a roof, and the base members of both are formed to match the ridge of a roof, and a cable, of a length to allow a limited sag, is positioned along the ridge of the roof and anchored at the respective ends thereof to the respective roof mounted anchors, the main anchoring components are installed.

20 Vandelinde, U.S. 5,297,651 describes a load transfer device and system having double safety cables permitting users to move freely and safely along elevated surfaces comprising a plurality of elongated T-shaped support brackets each having a body portion for anchoring to a support surface and a head portion for receiving a pair of equispaced cables. A load transfer device for slidable travel on the pair of cables and past the support brackets comprises a rectangular plate for receiving a lanyard, said plate having a pair of elongated hook-shaped jaws hingedly secured to each edge of the rectangular plate for receiving a safety cable therein, each said elongated hook-shaped jaw hinged to a side edge of the rectangular plate whereby the said jaw is substantially planar with the plate during no-load

conditions and whereby the load transfer device can freely pass a support bracket during no-load conditions.

Bredijk, U.S. 5,320,194 describes a scaffold that is arranged for temporary mounting to a canted roof to include an anchor bracket arranged for positioning to the roof peak, wherein a base platform pivotally mounts a support platform to orient the support platform in a horizontal alignment relative to the associated roof surface employing arcuate first and second legs mounted to a rear edge of the platform adjustably directed through sleeve members in fixed securement to the support platform.

10

Bell, et al., U.S. 5,361,866 describes a connector assembly for releasable securement to a portion of scaffolding on which a worker wearing a safety restraint member, e.g., safety belt and associated lanyard, will be disposed. The portion of the scaffolding comprises a cylindrical section having a pair of collars disposed on it. Each of the collars defines a channel between it and the cylindrical section. The connector assembly comprises an insert, a first connector pivotally secured by a bolt to the insert, a strap formed of a flexible web of material and having a loop at one end secured to the first connector, and D-ring secured to a loop at the other end of the strap. The insert has a pair of projections, each of which is arranged to be located within a respective one of the channels between the collars and the cylindrical section of the scaffolding to releasably secure the insert in place with respect to the scaffolding. The D-ring serves as a convenient connector for securing the lanyard thereto. A reinforcing pad formed of a wear resistant material is secured to the strap.

Eisenmenger, U.S. 5,601,154 describes a portable roof scaffold system comprising a combination transport/hook/standoff device, a fixed-direction ladder platform, a fixed-direction roof-ladder standoff, a multi-direction ladder platform, a multi-direction roof-ladder standoff, and one or more ladders. The combined use of these devices create an easily handled, easily set-up, scaffold which is supported above the roof surface, or the skeletal framework of a roof. The ladder platforms may be positioned at a predetermined angle with

respect to the ladder to form a level working platform on any roof slope, and may be slid along the ladder to raise or lower the working level on the roof even while remaining parallel to the angles of hips and valleys in the roof frame. Self-locking features of the ladder platforms make them easy and safe to relocate as work progresses.

5

Gray, U.S. 5,727,646 describes a retractable device and method for restraining a fall from a roof or other structure. The device has a first extended position to allow the attachment of a lifeline and a second retracted position, which conceals the apparatus below the exterior surface of a roof or other structure.

10

Ostrobrod, U.S. 5,730,407 describes a roof anchoring system for securing a safety winch assembly to a roof frame including such a safety line winch assembly that has a housing with a drum and a drum shaft mounted therein. A safety line, which is adapted to be wrapped around the drum, has one end secured to the drum and an opposite end adapted to be connected to a workman. A centrifugal brake is also mounted within the housing for preventing rapid rotation of the drum and therefore rapid unwinding of the safety line. The roof anchor includes a plate member that has a plurality of holes formed therethrough. Screws are inserted through the holes and into the roof to secure the roof anchor to the roof frame. A base frame assembly supports the winch assembly thereon and has a plurality of wheels rotatably mounted to and extending downwardly from the base frame member. The base frame assembly is mounted for rotation about the roof anchor.

20

Pantano, U.S. 5,845,452 describes an anchor for securing a safety line to a roof having a pair of sloping portions defining an angle therebetween. The anchor is in the form of a two person permanent roof anchor for use by the residential construction industry as an anchor point from which construction or contractor personnel may attach an approved life line to which an approved personal fall arrest safety device may be attached. The anchor comprises an anchor bracket having a pair of leg portions disposed at an angle in relation to the angle between the sloping portions of a roof so that the leg portions lie along the roof portions, and

fasteners for attaching the leg portions to the roof portions. The anchor further comprises at least one coupling member and a component for hingedly connecting the coupling member to the anchor bracket on one of the leg portions, the coupling member having a formation thereon for connection to one end of a safety line; the other end of which is connected to 5 safety equipment in the form of an approved personal fall arrest safety device for use by a person working on a roof. A pair of coupling members can be provided, each hingedly connected in a unidirectional manner to a corresponding one of the anchor bracket leg portions, the coupling members in turn being adapted for connection via two approved safety lines to a pair of approved fall arrest safety devices.

10

Nelson et al., U.S. 5,862,880 describes a roof scaffolding system of the type for use on a pitched roof that may be moved both longitudinally and laterally. The roof scaffolding system includes: a peak anchor having a carrying assembly connected atop thereof, the peak anchor being adapted for connecting to a pitched roof; a side rail assembly having a base member, a top member and a load support member adapted to support an elongated scaffold member, the load support member interconnecting the base member and the top member; and an elongated flexible member operationally connecting the side rail assembly and the peak anchor in a manner such that the side rail assembly may be moved longitudinally and laterally upon a roof. The roof scaffolding system may include a cross rail member 15 connected between to side rail assemblies to serve as a safety rail for a user. The roof scaffolding system may further include a net connectable between the side rail assemblies to prevent objects from falling from the work area.

Ostrobrod, U.S. 5,924,522 describes a cable grab safety device which releasably attaches a 25 workman's safety belt or harness lanyard to a vertically extending safety steel cable or the like. The device includes a primary frame assembly constructed of an elongated U-shaped bracket having a pair of spaced apart parallel side plates, which is adapted to fit around the cable. A secondary frame assembly also comprised of a pair of side plates is adapted to fit within the U-shaped bracket after the cable is inserted. The secondary frame assembly

carries a brake mechanism in the form of a pulley mounted in an elongated slot so as to be movable toward or away from the cable and a lever adapted to be attached to a worker's lanyard for moving the pulley so as to engage the cable in the event of a fall. An elongated bent pin connected between the primary and secondary frame assemblies allows for limited 5 pivotal and axial movement between them to thereby allow the cable to be inserted into the U-shaped bracket. A separate locking pin passes through aligned openings in the primary and secondary frame members to secure them together.

10 Ador, U.S. 6,227,329 describes a base plate adapted to be secured to a support structure. A transverse plate is secured to the base plate and extends outward from the base plate. A slot is formed in the transverse plate to receive a ring. A notch is formed in a sidewall of the slot to seat the ring within the slot. The ring is adapted to anchor an end of a safety line regardless of the orientation of the base plate relative to the desired orientation of the safety line 40.

15 Carter, U.S. 6,520,290 describes a personal fall protection system for securing a worker to an elevated and exposed structure defining a work area. The fall protection system includes a safety belt supported on the worker's body with a body harness. The safety belt includes two belt couplings movable in a channel around the belt, each adapted to be attached to a lanyard. Two spaced apart rails are mounted adjacent opposite side limits of the structure. A 20 movable anchor for securing the end of a lanyard is mounted to each rail. A lanyard ties off the worker at each belt coupling to an anchor. The fall protection system thereby secures the worker to both sides of the structure while allowing the worker to rotate relative to the lanyards within the work area and move freely forward and backwards throughout the work 25 area between the rails.

Our prior art search with abstracts described above teaches: a roof attachment member for safety lines, a roof scaffold, a motion stopping safety system for workers, a roof lifeline safety system and anchor assembly therefor, a fall restraint cable support method, a safety

device and system, a safety line anchoring device, a roof mounted anchor used singley or with another and with other equipment in a fall restraint and/or fall arrest system, a safety load transfer device and system, an adjustable roofing scaffold apparatus, a connector assembly for use on scaffolding to prevent a worker from falling, portable suspended roof scaffold system, a retractable fall restraint device, a roof anchoring system with a safety line, a roof anchor for safety equipment, a roof scaffolding system, a cable grab, a safetyline anchorage method and apparatus, a fall protection method and apparatus, but does not teach the anchor plates and attachments thereto of the present invention and does not teach the use thereof. The present invention fulfills the need for a simple safety attachment apparatus with maximum flexibility for worker movement and maximum security at the same time, is adaptable to peaked or flat roofs, and provides further related advantages as described in the following summary.

SUMMARY OF THE INVENTION

15

The present invention teaches certain benefits in construction and use which give rise to the objectives described below.

For workers positioned on scaffolds and other high locations, a safety cable is necessary to 20 provide security in case of falling or support collapse. This invention provides a low cost and quickly installed system that is useful on both flat and peaked roofs in several embodiments. For the peaked roof, a pair of flat plates are joined by a hinge and fastened over the peak of a roof so that an eye bolt attached to one of the plates is positioned outward of the roof. A safety cable is engaged with the eye bolt with its free end fastened directly to 25 a worker harness or to a walker cable. When a walker cable is used, as for the situation when worker mobility is required, a second pair of flat plates, also having eye bolts, are fastened on either side of the hinged pair and spaced apart, preferably to the ends of the roof. The walker cable is fastened between the second pair of flat plates attached to the eye bolts. A personnel cable is then fastened from the walker cable to the worker harness and this

walker cable is then able to move with a worker along a horizontal work path, providing mobility in painting, shingling, placing siding and similar construction jobs. The personnel cable is slidingly engaged with the walking cable to allow the worker to move about in working on a scaffold.

5

A primary objective of the present invention is to provide an apparatus and method of use of such apparatus that yields advantages not taught by the prior art.

Another objective is to provide such an invention capable of being quickly and easily
10 installed on, and thereafter removed from a building.

A further objective is to provide such an invention capable of being mounted over a peaked roof or a flat roof with improved security.

15 A still further objective is to provide such an invention capable of allowing a worker the freedom of lateral movement while maintaining security.

Other features and advantages of the present invention will become apparent from the following more detailed description, taken in conjunction with the accompanying drawings,
20 which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the present invention. In such drawings:

25 Figure 1 is a perspective view of one embodiment of the invention;
Figure 2 is a perspective view of a further embodiment thereof;
Figure 3 is a perspective view of a still further embodiment thereof;
Figure 4 is a perspective view of a pair of hinged flat plates thereof;
Figure 5 is a perspective view of a single flat plate thereof; and

Figure 6 is a perspective view of a safety hook used therewith.

DETAILED DESCRIPTION OF THE INVENTION

5 The above described drawing figures illustrate the invention in at least one of its preferred embodiments, which is further defined in detail in the following description. Those having ordinary skill in the art may be able to make alterations and modifications in the present invention without departing from its spirit and scope. Therefore, it must be understood that the illustrated embodiments have been set forth only for the purposes of example and that
10 they should not be taken as limiting the invention as defined in the following.

The present invention is a safety apparatus for securing a worker 5 positioned at a high location and who is subject to a fall, and comprises, in one embodiment, a pair of flat metal plates 10, 10' preferably about one foot square in size, and of substantial rigidity, and joined
15 by one or more hinges 20 so that the flat plates 10, 10' may be mutually rotated to form an angle between them. Please refer to Fig. 4. The flat plates 10, 10' each provide a plurality of mounting holes 12, and at least one of the pair of the flat plates 10 provides an eye bolt 14 rigidly engaged therewith and positioned to one side thereof. Preferably a rigid metal strap
15 is welded, or otherwise joined with the plate 10 such that the strap 15 extends beyond one
20 edge of the plate 10, as shown, wherein the eye bolt 14 is mounted in that portion of the strap 15 that extends so that the eye bolt 14 can be positioned to one side of a roof 8 while the plates 10, 10' are fully engaged with the roof's surface as shown in Figs. 1 and 2. A safety cable 30 is engaged at one of its ends 32 with the eye bolt 14 while the other end 34 of the safety cable 30 provides a safety hook 36 (Fig. 6) for fastening the safety cable 30 as
25 further described below.

In a further embodiment, a further pair of flat plates 10, which are not joined to each other by a hinge, each is fashioned in accordance with the construction of Fig. 5, so that each is fitted with eye bolt 14, as described above, i.e., rigidly engaged to one side, and each also has the

plurality of mounting holes 12. A walker cable 40, as shown in Figs. 1 and 3, is engaged at its ends 42, 44 with the eye bolts 14 of the two single flat plates 10, and a personnel cable 60 is engaged between the walker cable 40 and the harness 50, as shown in Figs. 1-3. As shown in Fig. 2, when no walker cable 40 is used, the worker is connected directly by personnel cable 60 to eye bolt 14.

The present apparatus, as described above is applied in use by a method comprising certain steps. First, the pair of flat plates 10, 10' which are joined by the hinge 20 are fastened over a peak of a roof 8, as shown in Fig. 1, and the personnel cable 60 is fastened to its eye bolt 14 and, in one embodiment, may be then joined to the worker harness 50. In a further embodiment, a further pair of individual flat plates 10 are fastened to the roof 8 in spaced apart positions on opposing sides of the roofs peak and engage a walker cable 40 at ends thereof with further eye bolts 14 of the spaced apart further flat plates 10. The safety cable 30, in this embodiment, is joined to the walker cable 40 to further secure it. Then, the personnel cable 60 is slidably joined to the walker cable 40 and to the worker harness 50, thus providing sliding engagement of the personnel cable 60 at one end thereof on the walker cable 40 thereby allowing the worker 5 to have considerable latitude of movement.

The enablements described in detail above are considered novel over the prior art of record and are considered critical to the operation of the instant invention and to the achievement of the above described objectives. The words used in this specification to describe the invention and its various embodiments are to be understood not only in the sense of their commonly defined meanings, but to include by special definition in this specification: structure, material or acts beyond the scope of the commonly defined meanings. Thus if an element can be understood in the context of this specification as including more than one meaning, then its use must be understood as being generic to all possible meanings supported by the specification and by the word or words describing the element.

The definitions of the words or elements of this described invention and its various embodiments are, therefore, defined in this specification to include not only the combination of elements which are literally set forth, but all equivalent structure, material or acts for performing substantially the same function in substantially the same way to obtain substantially the same result. In this sense it is therefore contemplated that an equivalent substitution of two or more elements may be made for any one of the elements in the invention and its various embodiments or that a single element may be substituted for two or more elements in a claim.

Changes from the claimed subject matter as viewed by a person with ordinary skill in the art, now known or later devised, are expressly contemplated as being equivalents within the scope of the invention and its various embodiments. Therefore, obvious substitutions now or later known to one with ordinary skill in the art are defined to be within the scope of the defined elements. The invention and its various embodiments are thus to be understood to include what is specifically illustrated and described above, what is conceptually equivalent, what can be obviously substituted, and also what essentially incorporates the essential idea of the invention.

While the invention has been described with reference to at least one preferred embodiment, it is to be clearly understood by those skilled in the art that the invention is not limited thereto. Rather, the scope of the invention is to be interpreted only in conjunction with the appended claims and it is made clear, here, that the inventor(s) believe that the claimed subject matter is the invention.